



U.S. DEPARTMENT OF ENERGY
SOLAR DECATHLON

2011

Energy Efficiency 101: Creating a Healthier Home

- Learn about the importance of indoor air quality and health & safety in the home. The presenter will explore how health & safety are related to energy efficiency. The workshop will also highlight what to look for and what to avoid.

Healthy Homes 101

When is a home healthy?

- *Safe*
- *Dry*
- *Clean*
- *Pest-free*
- *Ventilated*
- *Maintained*
- *& Toxin Free*



When is a home healthy?

- *Safe*
- *Dry*
- *Clean*
- *Pest-free*
- *Ventilated*
- *Maintained*

• *& Toxin Free*



Don't Smoke Inside!

SURGEON GENERAL'S WARNING: Smoking Causes Lung Cancer, Heart Disease, Emphysema, And May Complicate Pregnancy.

*Tobacco Smoke Kills:
You don't have to be a smoker
to die from Lung Cancer!*

2,000,000

*# of ER visits per year in the U.S.
due to Asthma Attacks*

19%

*% of U.S. Families with
at least 1 Asthmatic*

40%

*Increased risk of Asthma
in damp houses*

"There really are monsters under the bed!"



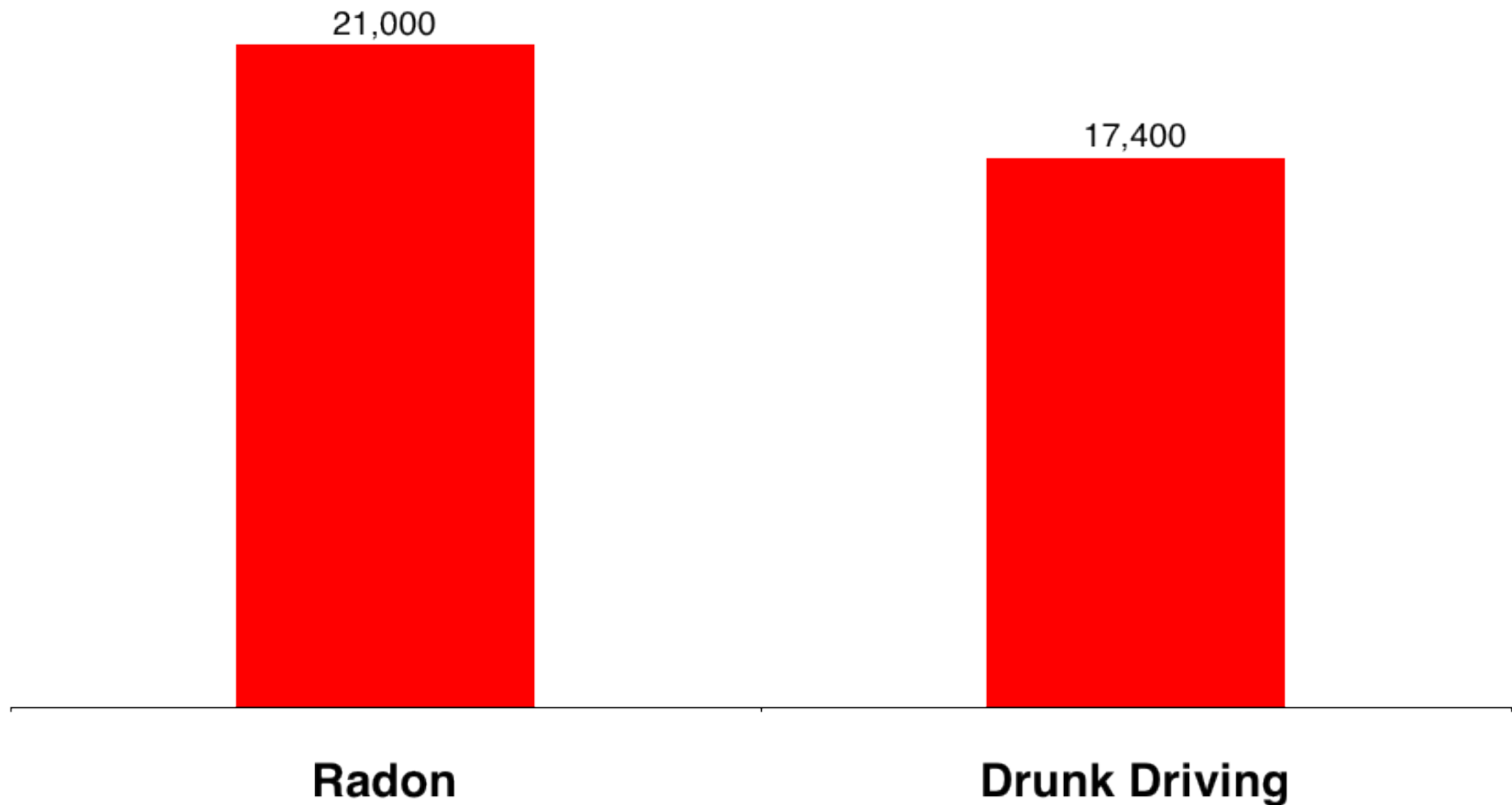
20,000

*Cancer deaths per year in the U.S.
due to Radon*

The other warning

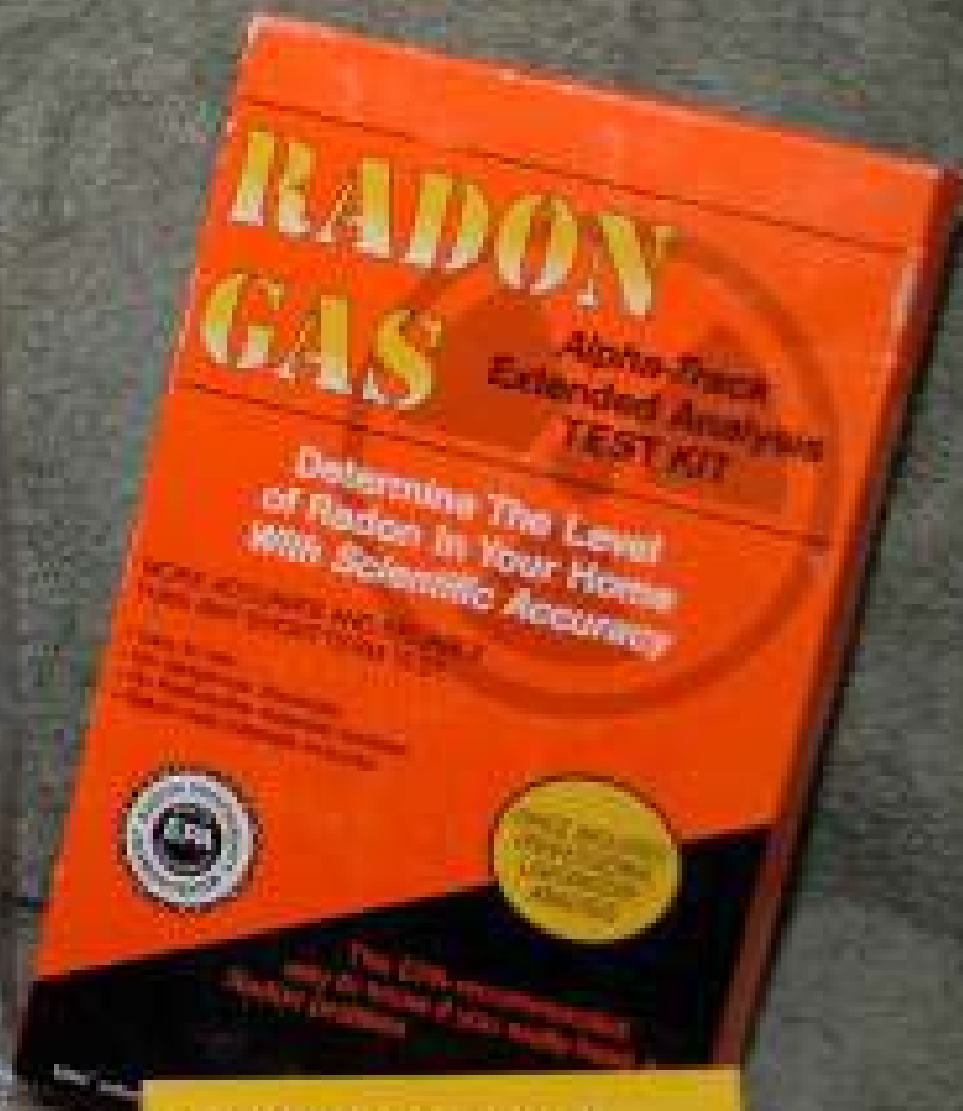
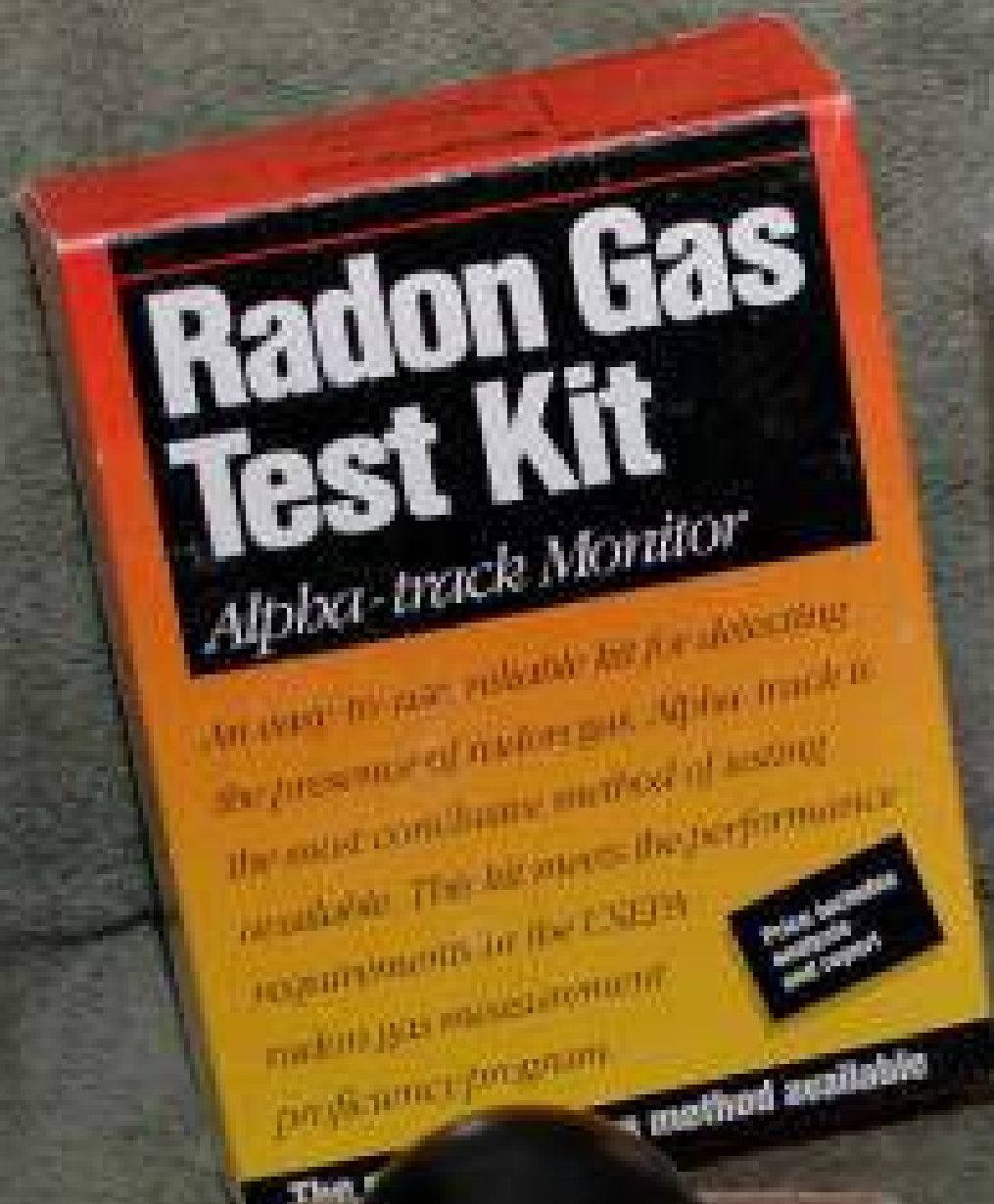
**SURGEON GENERAL's WARNING:
Radon causes lung cancer.**

Radon deaths per year



1 in 15

*Have you tested your home
for Radon?*



EPA does not endorse any specific brand of Radon Test Kit

Air pollution?



2 to 5 Times

*EPA estimates 2 to 5 times higher
chemical pollutant levels indoors*

What
chemicals
are in
homes?

Nutrition Facts

Serving Size 1/2 cup (57g)

Servings Per Container 15

Amount Per Serving

Calories 230 **Calories from Fat** 100

% Daily Value*

Total Fat 11g **17%**

Saturated Fat 2g **10%**

Trans Fat 0g

Cholesterol 0mg **0%**

Sodium 95mg **4%**

Total Carbohydrate 32g **11%**

Dietary Fiber 3g **12%**

Sugars 18g

Protein 5g

Vitamin A 0% • Vitamin C 0%

Calcium 4% • Iron 10%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

		Calories	2,000	2,500
Total Fat	Less Than	65g	80g	
Saturated Fat	Less Than	20g	25g	
Cholesterol	Less Than	300mg	300 mg	
Sodium	Less Than	2,400mg	2,400mg	
Total Carbohydrate		300g	375g	
Dietary Fiber		25g	30g	

Calories per gram:

Fat 9 • Carbohydrate 4 • Protein 4

*Is my house
making me
sick?*



Maybe not

It's about ...

Reduce Your

RISK



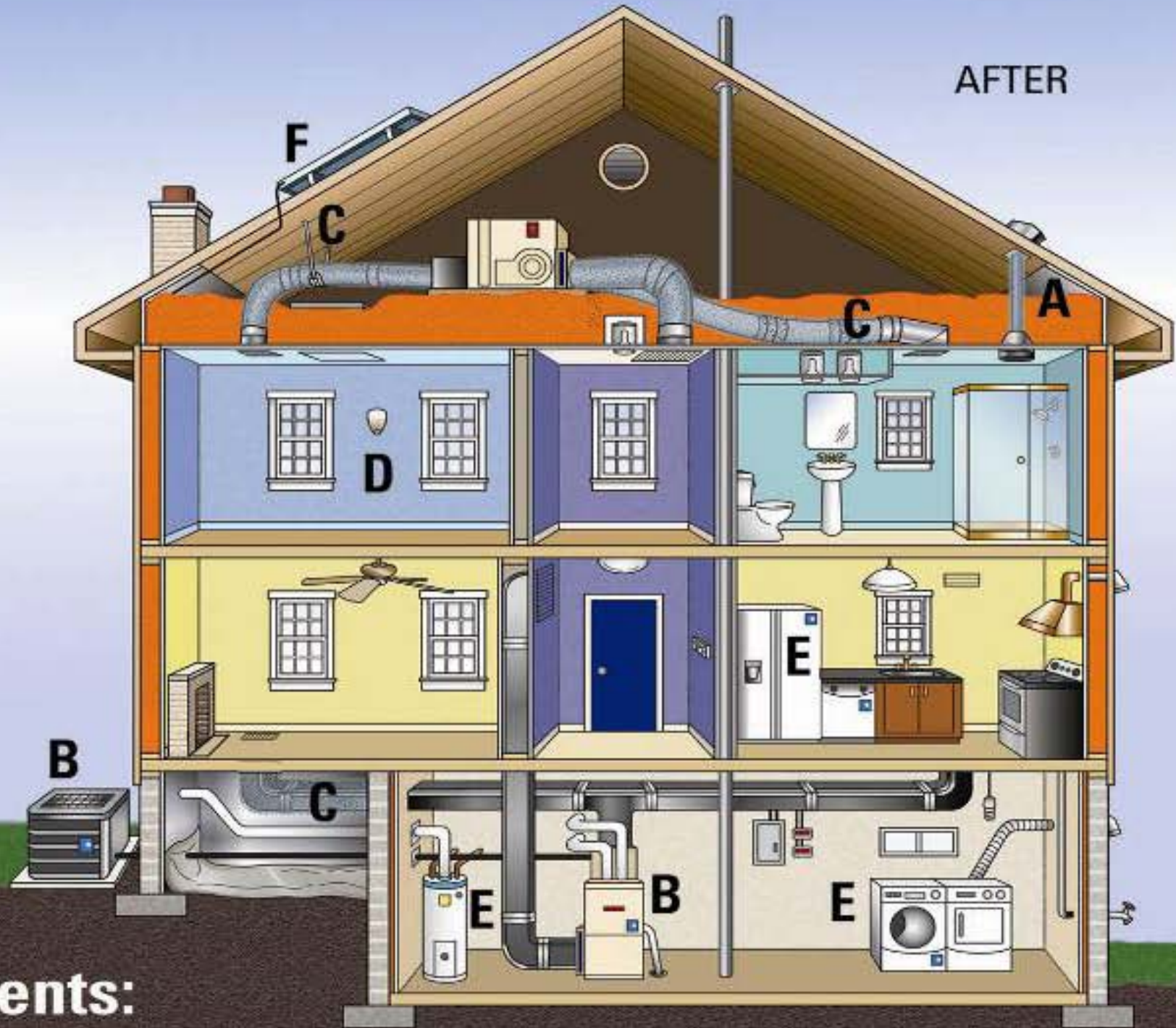
*What can we
do about
these risks?*

Home Performance Improvements

BEFORE



AFTER



Typical Home Improvements:

- A** Sealing Air Leaks and Adding Insulation
- B** Improving Heating and Cooling Systems
- C** Sealing Ductwork
- D** Replacing Windows
- E** Upgrading Lighting, Appliances, and Water Heating Equipment

Indoor Air Quality Improvements

Asthma is a serious, sometimes life-threatening respiratory disease that affects the quality of life for millions of Americans.

Environmental asthma triggers are found around the home and can be eliminated with simple steps.

- Don't allow smoking in your home or car.
- Dust and clean your home regularly.
- Clean up mold and fix water leaks.
- Wash sheets and blankets weekly in hot water.
- Use allergen-proof mattress and pillow covers.
- Keep pets out of the bedroom and off soft furniture.
- Control pests—close up cracks and crevices and seal leaks; don't leave food out.

Children are especially sensitive to secondhand smoke, which can trigger asthma and other respiratory illnesses.

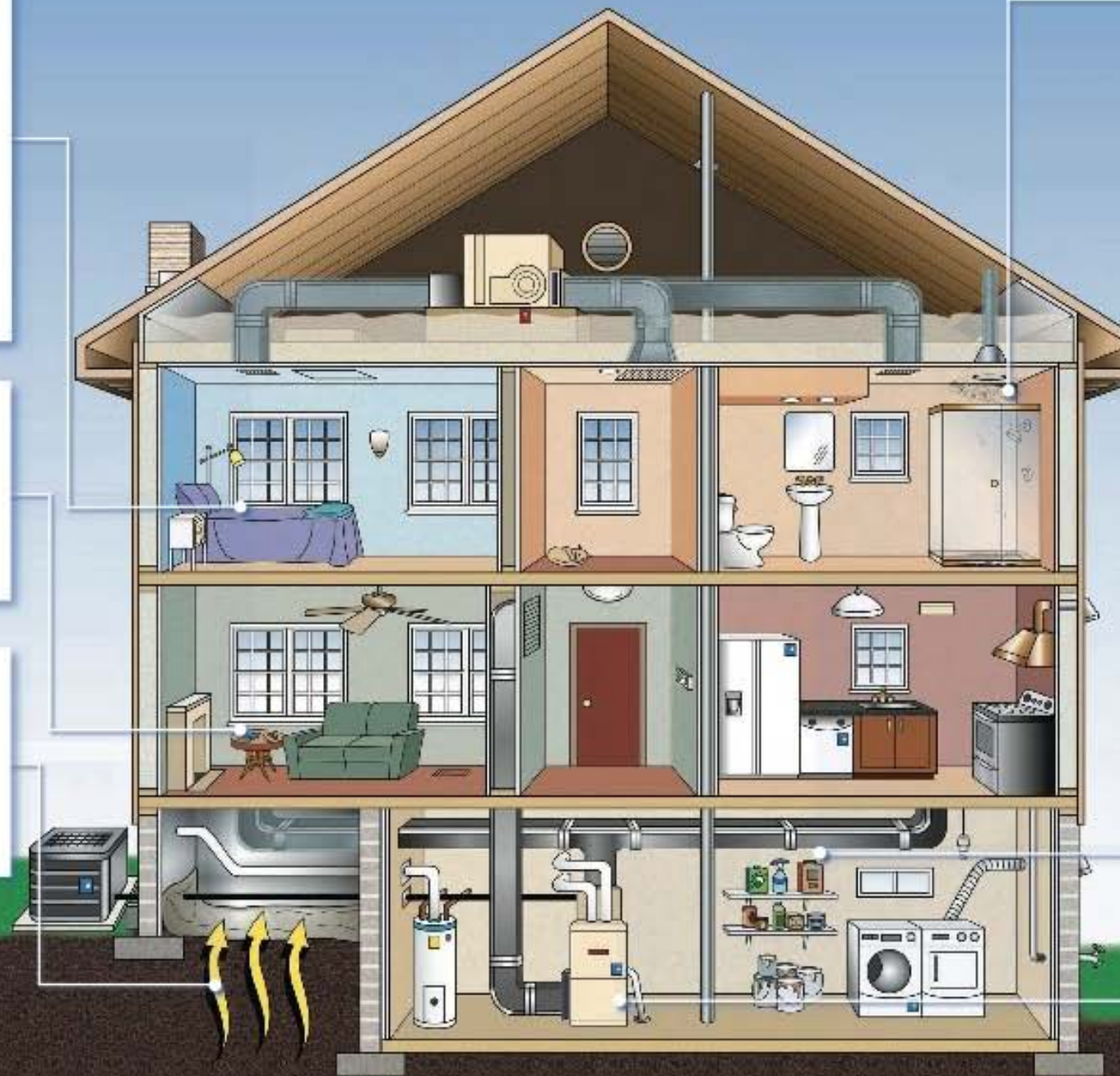
Secondhand smoke: smoke comes from burning tobacco products such as cigarettes, pipes, and cigars.

- To help protect children from secondhand smoke, do not smoke or allow others to smoke inside your home or car.

Radon is the second leading cause of lung cancer.

Radon gas: enters your home through cracks and openings in floors and walls in contact with the ground.

- Test your home with a do-it-yourself radon kit. If the test result indicates you should fix, call a qualified radon mitigation specialist.
- Ask your builder about including radon-reducing features in your new home at the time of construction.



Mold can lead to allergic reactions, asthma, and other respiratory ailments.

Mold: can grow anywhere there is moisture in a house.

- The key to mold control is moisture control.
- If mold is a problem in your home, you should clean up the mold promptly and fix the water problem.
- It is important to dry water-damaged areas and items within 24-48 hours to prevent mold growth.

VOCs cause eye, nose, and throat irritation, headaches, nausea, and can damage the liver, kidney, and central nervous system.

Volatile organic compounds (VOCs): are chemicals that evaporate at room temperature. VOCs are emitted by a wide array of products used in homes including paints and lacquers, paint strippers, varnishes, cleaning supplies, air fresheners, pesticides, building materials, and furnishings. VOCs are released from products into the home both during use and while stored.

- Read and follow all directions and warnings on common household products.
- Make sure there is plenty of fresh air and ventilation (e.g., opening windows and using extra fans) when painting, remodeling, or using other products that may release VOCs.
- Never mix products, such as household cleaners, unless directed to do so on the label.
- Store household products that contain chemicals according to manufacturers' instructions.
- Keep all products away from children!

Carbon monoxide causes headaches, dizziness, disorientation, nausea and fatigue, and high levels can be fatal.

Nitrogen dioxide causes eyes, nose, and throat irritation, impairs lung function, and increases respiratory infections.

Sources include: indoor use of furnaces, gas stoves, unvented kerosene and gas space heaters, leaking chimneys, and tobacco products.

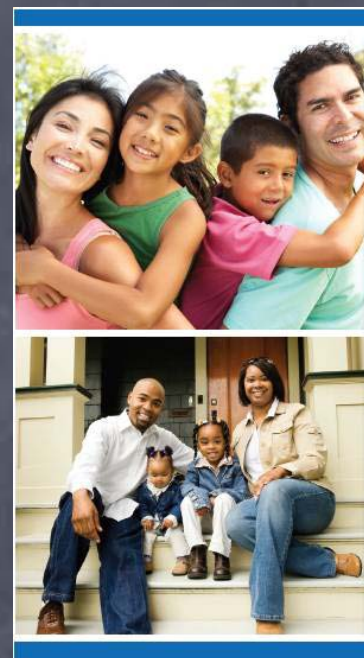
- Ventilate rooms where fuel-burning appliances are used.
- Use appliances that vent to the outside whenever possible.
- Ensure that all fuel-burning appliances are properly installed, used, adjusted, and maintained.

Visit www.epa.gov/iaq

Can't we just
buy a
Healthier
Home?

*Symbol for indoor
air quality*

*Healthy
families*



*Symbol for
energy efficiency*

*Healthy
Home*

Indoor airPLUS

Indoor airPLUS Program | Indoor Air | US Environmental Protection Agency

http://www.epa.gov/indoorairplus/index.html

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 **EPA** United States Environmental Protection Agency

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Indoor airPLUS Program

Find a Builder or Indoor airPLUS Partner Near You.

Homes with the Indoor airPLUS label are designed for improved indoor air quality compared to homes built to minimum code.

1

2

3

4





Why design and build with Indoor airPLUS? EPA created Indoor airPLUS to help builders meet the growing consumer preference for homes with improved indoor air quality. By constructing homes that meet EPA's stringent [specifications](#), forward-thinking builders can distinguish themselves by being among the first to offer homes designed to deliver improved indoor air quality. [Step Up to Indoor airPLUS \(PDF\)](#) (8 pp., 1 M, [about PDF](#))

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Indoor Air Quality

Top Three Questions

1. How can I partner with the Indoor airPLUS program?

2. How do I find a home energy rater that offers Indoor airPLUS verification services?

3. How much will it cost to participate?

[More Indoor airPLUS Questions](#)
[Read more about Indoor Air Quality \(IAQ\)](#)

How do I ...?

- [Become a Partner](#)
- [Know what to look for](#) when buying a new home
- [Learn about the advantages](#) of an Indoor airPLUS Home
- Find the [Construction Specifications](#) and the [Verification Checklist](#)

Stay Connected with Indoor airPLUS



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Click Here
to sign up for e-mail updates on EPA's Indoor airPLUS Program



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Indoor airPLUS Program

**Better Environments
Inside and Out**

Homes with the Indoor airPLUS label are designed for improved indoor air quality compared to homes built to minimum code.

1

2

3

4



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Upcoming Events

Listed below are the final three parts of the EPA Habitat series.

September 29 1:00 to 2:00 EDT, Working with your HVAC Contractor: ENERGY STAR Version 3 will require more support from your HVAC contractor. [Register for this Webinar.](#)
[EXIT Disclaimer](#)

October 6: 1:00 to 2:00 EDT, Completing the Water Management/IAP checklist: The Indoor airPLUS program and the ENERGY STAR Version 3 program align closely. [Register for this Webinar.](#)
[EXIT Disclaimer](#)

Partner Updates

Meet the Builder: Tom Wade, Co-Owner, Artistic Homes "Commitment and Strategy in Action"

Artistic Homes has been a frontrunner in energy efficient home building for years by incorporating the latest building science techniques. They are an industry leader in new construction focusing on energy efficiency, indoor green design and sustainable building practices.

Read the first in a series of Partner Profiles to learn from industry experts who are committed to building 100% Indoor airPLUS homes. Learn about the challenges Artistic Homes has faced and the successes they have experienced by incorporating Indoor airPLUS. Also, learn about their decision to say "We're In" to **ENERGY STAR Version 3** and why they believe this commitment will work to their advantage. [Read More.](#)

Learn more about EPA's voluntary New Home Labeling Programs:

Contact UsShare

Top Three Questions

1. How can I partner with the Indoor airPLUS program?
2. How do I find a home energy rater that offers Indoor airPLUS verification services?
3. How much will it cost to participate?

[More Indoor airPLUS Questions](#)
[Read more about Indoor Air Quality \(IAQ\)](#)

How do I ...?

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- [Know what to look for](#) when buying a new home
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to sign up for e-mail updates on EPA's Indoor airPLUS Program

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*But we like our
current home!
How can we
make it
Healthier?*

Does your house have symptoms?



Get a diagnosis!

Call a House Dr.

(a Home Performance Professional)



*Where can we find a
House Dr.?*

Check out these programs...

ENERGY STAR

Home Performance with ENERGY STAR : ENERGY STAR

http://www.energystar.gov/index.cfm?fuseaction=hpwes_profiles.showSplash

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ENERGY STAR



A NEW ENERGY STAR QUALIFIED HOME IMPROVES OUR ENVIRONMENT
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Seal & Insulate

Heat & Cool Efficiently

Join ENERGY STAR

Home > Home Improvement > Assess Your Home > Home Performance with ENERGY STAR

HOME PERFORMANCE WITH ENERGY STAR



More than 75,000 families have had their homes improved through Home Performance with ENERGY STAR, a comprehensive, whole-house approach to improving energy efficiency and home comfort, while helping to protect the environment. These families are enjoying benefits like, fewer drafts, consistent temperatures across rooms, better ventilation and humidity control, and lower utility bills.

Stories from Home Performance with ENERGY STAR Families



Matt and Lisa Nutting • Fresno, California • Rare Service
When the Nutting family was battling asthma, respiratory problems, mold, and high energy bills, they called a local contractor participating in Home Performance with ENERGY STAR. The contractor, trained to diagnose and fix homes using a "house as a system" approach, found leaky ducts, poor attic insulation, and unsealed can lights in the ceiling. To improve the health of the family and lower energy bills, the ducts were repaired and replaced, the attic insulation was upgraded, the can lights were sealed and the HVAC unit was replaced. The Nuttings could not be happier with their results.
[Read Full Story](#)  (862KB)

LEARN MORE ABOUT



HOME PERFORMANCE WITH ENERGY STAR



What to Expect >

Watch the Video >





Home Performance Locations >

For Sponsors >





Mortgage Lending Programs >

Tell Us Your Story

Does your family have a story to tell about the home improvements you've made through Home Performance with ENERGY STAR? We'd like to hear about your experience.

Share your Story and you might be featured here:



RESNET

RESNET - Residential Energy Services Network

http://www.resnet.us/home2

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RESNET

RESIDENTIAL ENERGY SERVICES NETWORK

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FACTS

FIND A
SOLUTION

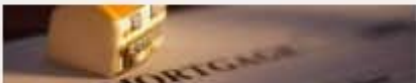
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GET THE
FACTS AND
SAVE \$

A Resnet-certified inspector
can save you energy and money.
[Get a professional assessment so you can start today!](#)

Only a Resnet-certified professional has the training and skills to perform the most thorough energy assessment of your home. Resnet's federally-approved standards ensure that you get the information you need to make cost-effective changes to stop wasting energy-- and start saving money.

ENERGY MORTGAGES



Energy Efficient Mortgages
Increasingly popular energy mortgages are making homes more affordable.

What is an Energy Mortgage?

CASE STUDIES & VIDEOS

Case Studies

+ Guillen Residence in New Orleans
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HERS Index



What is a Home Energy Rating?
A home energy rating measures how energy efficient a home is.

HERS Index

BPI

BPI: Energy efficiency information for homeowners

http://www.bpi.org/homeowners.aspx

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WHAT WE DO

CERTIFIED PROFESSIONALS

ACCREDITED CONTRACTORS

BPI STANDARDS

GOVERNMENT SERVICES

HOME OWNERS

GREEN COLLAR JOBS

AFFILIATES

TRAINING & EDUCATION

Benefits of Home Performance

Guide to Selecting Contractors

Incentives

Verify Certification

FAQs

Improve the comfort, health safety, durability and energy efficiency of your home

We understand that you want the best contractor working on your home. That's why we're raising the bar in home performance contracting by establishing national standards, professional certification, company accreditation and quality assurance programs.



When you choose a BPI certified professional or accredited contracting company, you get a member of the elite – someone who has proven that they have the knowledge and skills to diagnose the root cause of the problems in your house and the ability to provide solutions to fix it right the first time.

That means you get your money's worth – a comfortable, safe, durable home with improved indoor air quality and lower energy bills.

[Learn more with this easy-to-understand article on BPI from the Examiner](#)

Your house is a system.

Accelerate return on

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 **Find a BPI Approved Contractor now!**

Homeowners: Tell us about your experience

Consumer Feedback

Homeowner: Frequently asked questions.

Have a question about home performance contracting? Find the answer here!

Don't let just anyone work on your home.



Healthy Homes Contractors



Click [Search by Location](#) to find healthy homes contractors and consultants in your community. Click [Search by Name](#) to view the credentials for firms that have that name. Click on the credentials listed below to learn more about the credential program. To register your business, please click on the "Firm" link at the bottom of the page.

Purpose of the Healthy Homes Contractors Website

This website is designed to assist you in locating a consultant or contractor to help you maintain a safe and healthy home. Finding a reputable consultant or contractor to assess or control a healthy homes hazard can be challenging. Consultants and contractors often advertise their qualifications, but few buyers can judge the qualifications. Funded by HUD to develop this pilot web site, NCC and NCHH reviewed a number of credentialing programs and identified those that appear reliable for dealing with healthy homes hazards. This website provides you with data to help you make informed decisions about a contractor or consultant to resolve your healthy homes issues.

Note to users: Neither NCC, NCHH nor HUD guarantees or is responsible for the quality or timeliness of work of a contractor or consultant with a credential listed below.

Weatherization

Weatherization and Intergovernmental Program: Apply for Weatherization Assistance

+

http://www1.eere.energy.gov/wip/wap_apply.html

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WAP - Weatherization Innovation Pilot Program

State Energy Program

Energy Efficiency & Conservation Block Grant Program

Tribal Energy Program

Recovery Act

Home Energy Professional Guidelines

Contacts

Apply for Weatherization Assistance

It is easy to find out if you are eligible and to apply for weatherization. Usually you can do it in a weatherization agency near your home.


- [Am I Eligible?](#)
- [How does the process work?](#)
- [Frequently asked questions](#)

Am I Eligible?

As many as 20 to 30 million U.S. families are eligible for weatherization services nationwide. Services are provided by the states, and each state has slightly different criteria. All energy services are handled by local weatherization agencies.

If you receive Supplemental Security Income or Aid to Families with Dependent Children, you are automatically eligible to receive weatherization services. In other cases, states give preference to:

- People over 60 years of age
- Families with one or more members with a disability
- Families with children (in most states).

One of the primary factors affecting eligibility is income. Depending on what state you live in, you are eligible for weatherization if your income falls below the "200% poverty level" defined in the PDF below. Note, however, that some states use a third alternative to set eligibility if your income is less than 60% of the median income in your state; and minimum incomes for Hawaii and Alaska, respectively, are slightly higher. For details, see the [DOE Poverty Income Guidelines for 2009](#) .

How does the process work?

- Call local agency
 - The states, not DOE, keep up-to-date lists of local weatherization agencies.
 - All weatherization services are provided by local agencies.
 - Most agencies are nonprofits that employ energy professionals.

Want to apply immediately?

Select your state from the map on the [State Contacts](#) page and get the phone number and address of your state weatherization office.

WAP Plus Health

Healthy Homes – Weatherization Plus Health – NASCSP

http://www.nascsp.org/Weatherization-Plus-Health.aspx

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NATIONAL ASSOCIATION FOR STATE COMMUNITY SERVICES PROGRAMS

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REQUESTS FOR PROPOSALS



WEATHERIZATION PLUS HEALTH



CSBG CLEARINGHOUSE



Weatherization Plus Health

Weatherization Plus Health: A National Effort for Local Healthy Homes Collaboration

The U.S. Department of Energy's (DOE) Weatherization Plus Health initiative is a national effort to enable the comprehensive, strategic coordination of resources for energy, health, and safety in low-income homes. The National Association of State Community Services Programs (NASCSP) is implementing the project on behalf of DOE. Weatherization Plus Health will ensure energy efficient and healthy indoor environments by facilitating the establishment of strong, effective partnerships between Grantees of the Weatherization Assistance Program (WAP) and providers of healthy homes services.

To encourage greater collaboration between practitioners of healthy homes and DOE's Weatherization Assistance Program, Weatherization Plus Health will deliver:

- Individual reports on the healthy homes infrastructure in every state and territory
- Training and technical assistance for providers of healthy homes and weatherization services
- Best practices for referral systems between healthy homes and Weatherization programs
- Six regional conferences to bring together healthy homes and weatherization providers, identify gaps between existing partnerships, and encourage new partnerships
- A public website that will map healthy homes and weatherization programs nationwide and include an inventory of healthy homes projects nationwide funded by HUD, EPA, and CDC

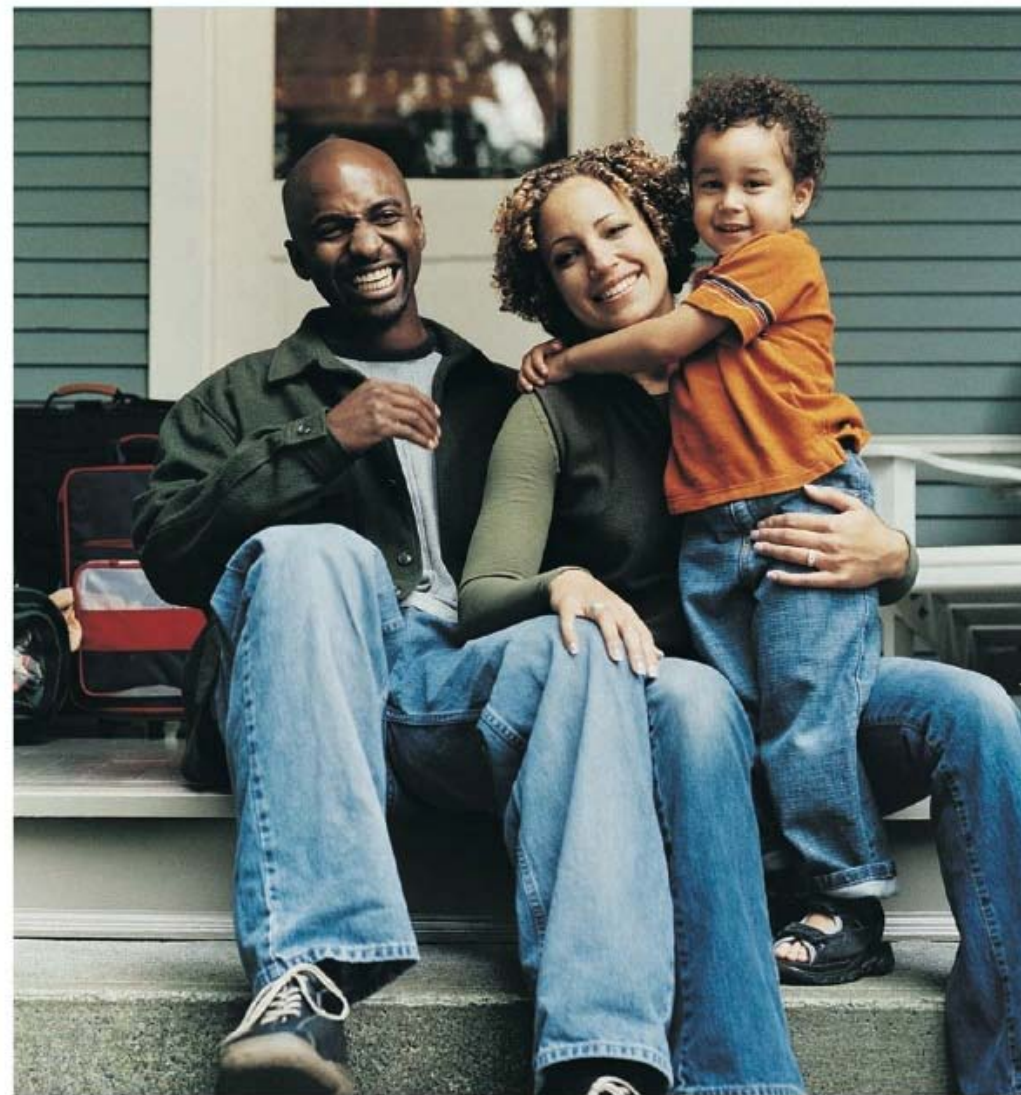
Who should attend the Weatherization Plus Health Regional Conferences?

DOE encourages the participation of any interested parties who work in the fields of energy efficiency or health and safety. Target audiences include:

• State and local WAP staff

Handy?

DIY



A DO-IT-YOURSELF GUIDE TO SEALING
AND INSULATING WITH ENERGY STAR®
SEALING AIR LEAKS AND ADDING ATTIC INSULATION



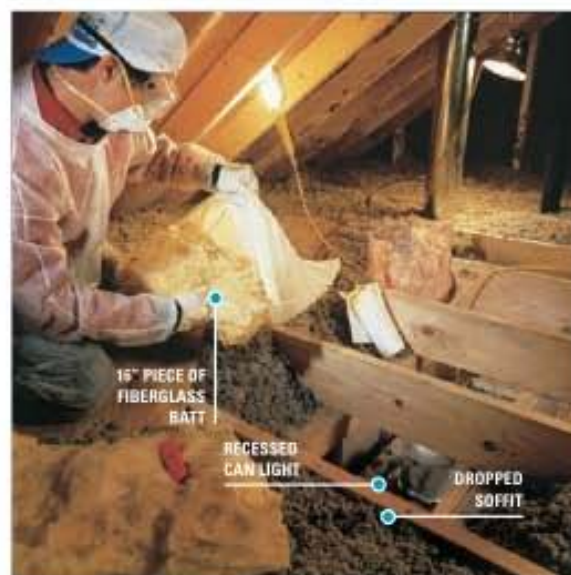
EPA's DIY Home Sealing & Insulating Guide

SEALING ATTIC AIR LEAKS

Plug the Big Holes First

Don't worry about finding and sealing all the little holes in your attic; your biggest savings will come from plugging the large ones. Once in the attic, refer to your sketch to locate the areas where leakage is likely to be greatest: where walls (inner and outer) meet the attic floor, dropped soffits (dropped-ceiling areas), and behind or under attic kneewalls. Look for dirty insulation—this indicates that air is moving through it. Dropped soffits may be filled or covered with insulation and hard to see. Push back the insulation and scoop it out of the soffits. You will place this insulation back over the soffit once the stud cavities have been plugged and the soffits covered (photos 1-3) (If you have recessed "can" lights in your open soffits, please read about them on Page 2.2 before proceeding).

1. CREATE STUFFED BAGS



Cut a 16 inch long piece from a batt of unfaced fiberglass insulation and fold it into the bottom of a 13-gallon plastic garbage bag.

2. PLUG OPEN STUD CAVITIES



Fold the bag and stuff it into the open stud cavity. Add more insulation to the bag if it doesn't fit tightly. Plug all open stud spaces, then cover the soffit (photo 3, Page 1.7).

3. COVER DROPPED SOFFITS



After removing insulation from a dropped soffit, cut a length of reflective foil or other blocking material (rigid foam board works well) a few inches longer than the opening to be covered. Apply a bead of caulk or adhesive around the opening. Seal the foil to the frame with the caulk/adhesive and staple or nail it in place, if needed.

4. SEAL BEHIND KNEEWALLS



Cut a 24 inch long piece from a batt of fiberglass insulation and place it at the bottom of a 13-gallon plastic garbage bag. Fold the bag over and stuff it into the open joist spaces under the wall (a piece of rigid foam board sealed with spray foam also works well for covering open joist cavities). Again, cover with insulation when you're done.

If You Have a Finished Attic, Seal Behind the Kneewalls

Finished rooms built into attics often have open cavities in the floor framing under the side-walls or kneewalls. Even though insulation may be piled against or stuffed into these spaces, they can still leak air. Again, look for signs of dirty insulation to indicate air is moving through. You need to plug these cavities in order to stop air from traveling under the floor of the finished space (photo 4).

Caution: Some attics have vermiculite insulation, which may contain asbestos, a health hazard. Vermiculite is a lightweight, pea-size, flaky gray mineral. Don't disturb vermiculite insulation unless you've had it tested by an approved lab to be sure it doesn't contain asbestos. Contact your local health department for the name of an approved lab.

EPA's Care for your Air

Take Action to Improve Air Quality in Every Room

Asthma is a serious, sometimes life-threatening respiratory disease that affects the quality of life for millions of Americans.

Environmental asthma triggers: are found around the home and can be eliminated with simple steps.

- Don't allow smoking in your home or car.
- Dust and clean your home regularly.
- Clean up mold and fix water leaks.
- Wash sheets and blankets weekly in hot water.
- Use allergen-proof mattress and pillow covers.
- Keep pets out of the bedroom and off soft furniture.
- Control pests—close up cracks and crevices and seal leaks; don't leave food out.

Children are especially sensitive to secondhand smoke, which can trigger asthma and other respiratory illnesses.

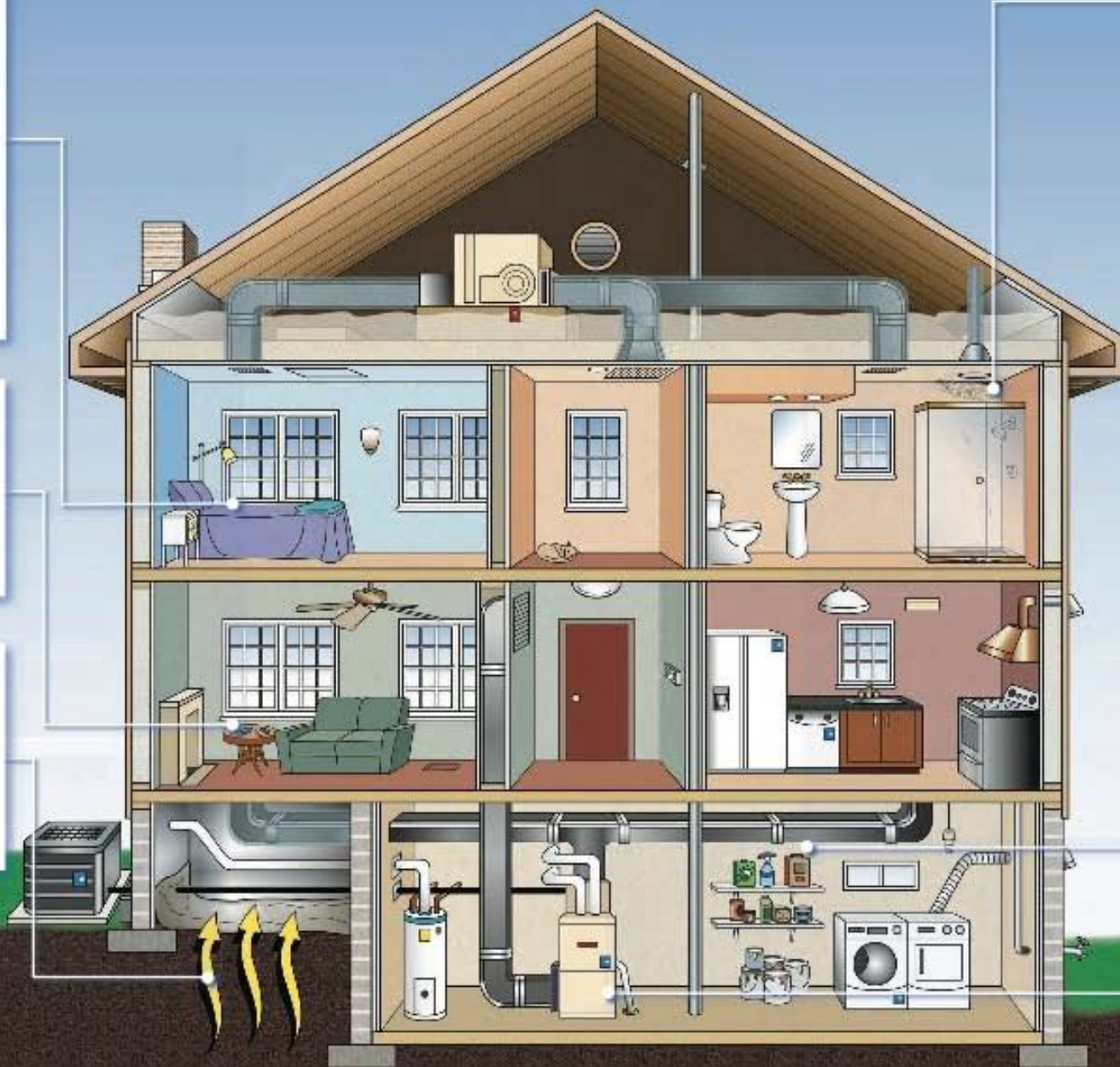
Secondhand smoke: smoke comes from burning tobacco products such as cigarettes, pipes, and cigars.

- To help protect children from secondhand smoke, do not smoke or allow others to smoke inside your home or car.

Radon is the second leading cause of lung cancer.

Radon gas: enters your home through cracks and openings in floors and walls in contact with the ground.

- Test your home with a do-it-yourself radon kit. If the test result indicates you should fix, call a qualified radon mitigation specialist.
- Ask your builder about including radon-reducing features in your new home at the time of construction.



Mold can lead to allergic reactions, asthma, and other respiratory ailments.

Mold: can grow anywhere there is moisture in a house.

- The key to mold control is moisture control.
- If mold is a problem in your home, you should clean up the mold promptly and fix the water problem.
- It is important to dry water-damaged areas and items within 24-48 hours to prevent mold growth.

VOCs cause eye, nose, and throat irritation, headaches, nausea, and can damage the liver, kidney, and central nervous system.

Volatile organic compounds (VOCs): are chemicals that evaporate at room temperature. VOCs are emitted by a wide array of products used in homes including paints and lacquers, paint strippers, varnishes, cleaning supplies, air fresheners, pesticides, building materials, and furnishings. VOCs are released from products into the home both during use and while stored.

- Read and follow all directions and warnings on common household products.
- Make sure there is plenty of fresh air and ventilation (e.g., opening windows and using extra fans) when painting, remodeling, or using other products that may release VOCs.
- Never mix products, such as household cleaners, unless directed to do so on the label.
- Store household products that contain chemicals according to manufacturers' instructions.
- Keep all products away from children!

Carbon monoxide causes headaches, dizziness, disorientation, nausea and fatigue, and high levels can be fatal.

Nitrogen dioxide causes eyes, nose, and throat irritation, impairs lung function, and increases respiratory infections.

Sources include: indoor use of furnaces, gas stoves, unvented kerosene and gas space heaters, leaking chimneys, and tobacco products.

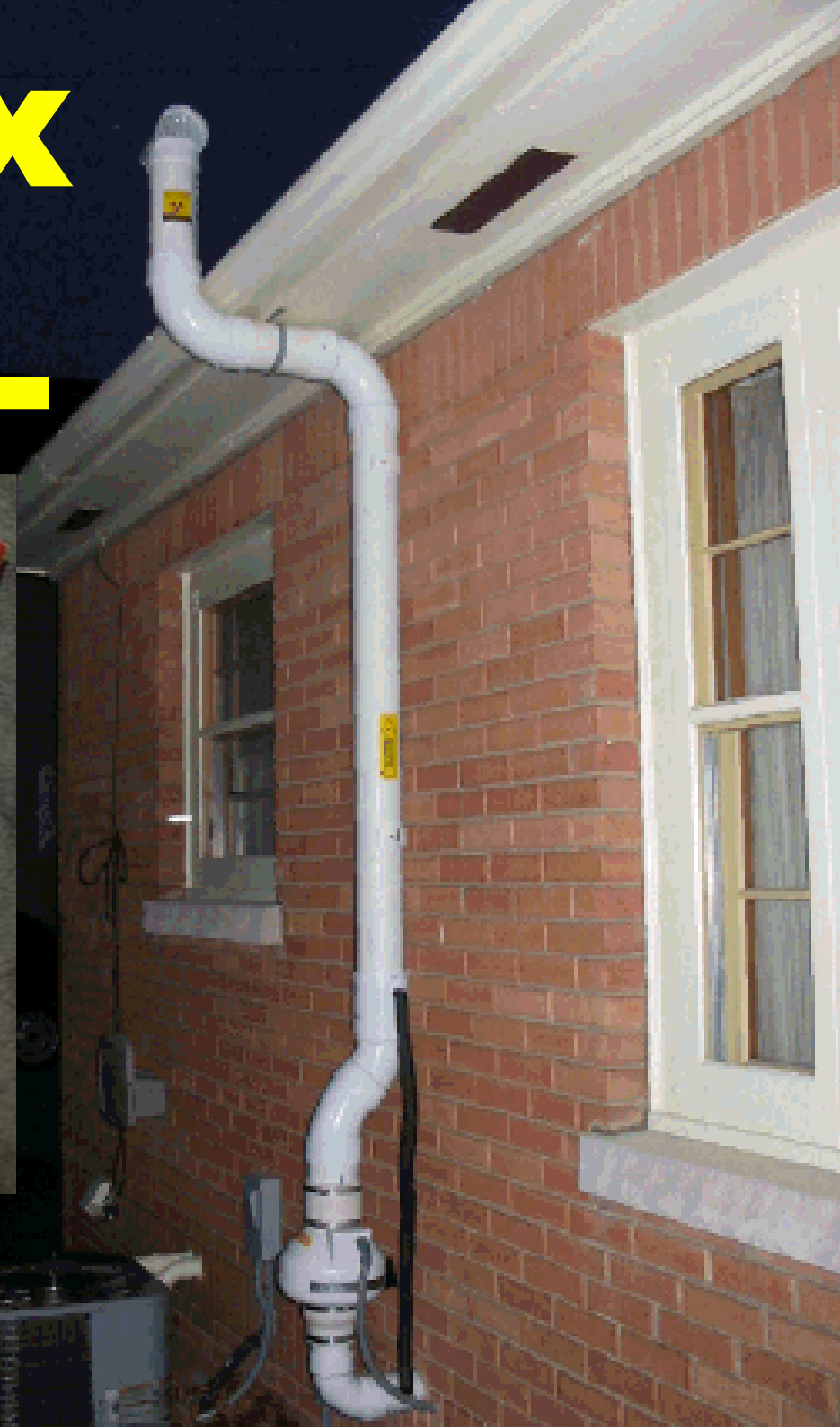
- Ventilate rooms where fuel-burning appliances are used.
- Use appliances that vent to the outside whenever possible.
- Ensure that all fuel-burning appliances are properly installed, used, adjusted, and maintained.

Visit www.epa.gov/iaq



Test & Fix if >4 pCi/L

THIS ↘

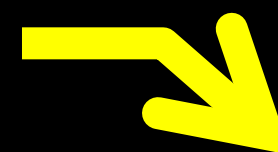


NOT THAT!



Lead Safe Work:

THIS



NOT



THAT!



INSTALL/TEST CO Alarms:



**NEVER
Run a Generator
Inside!**



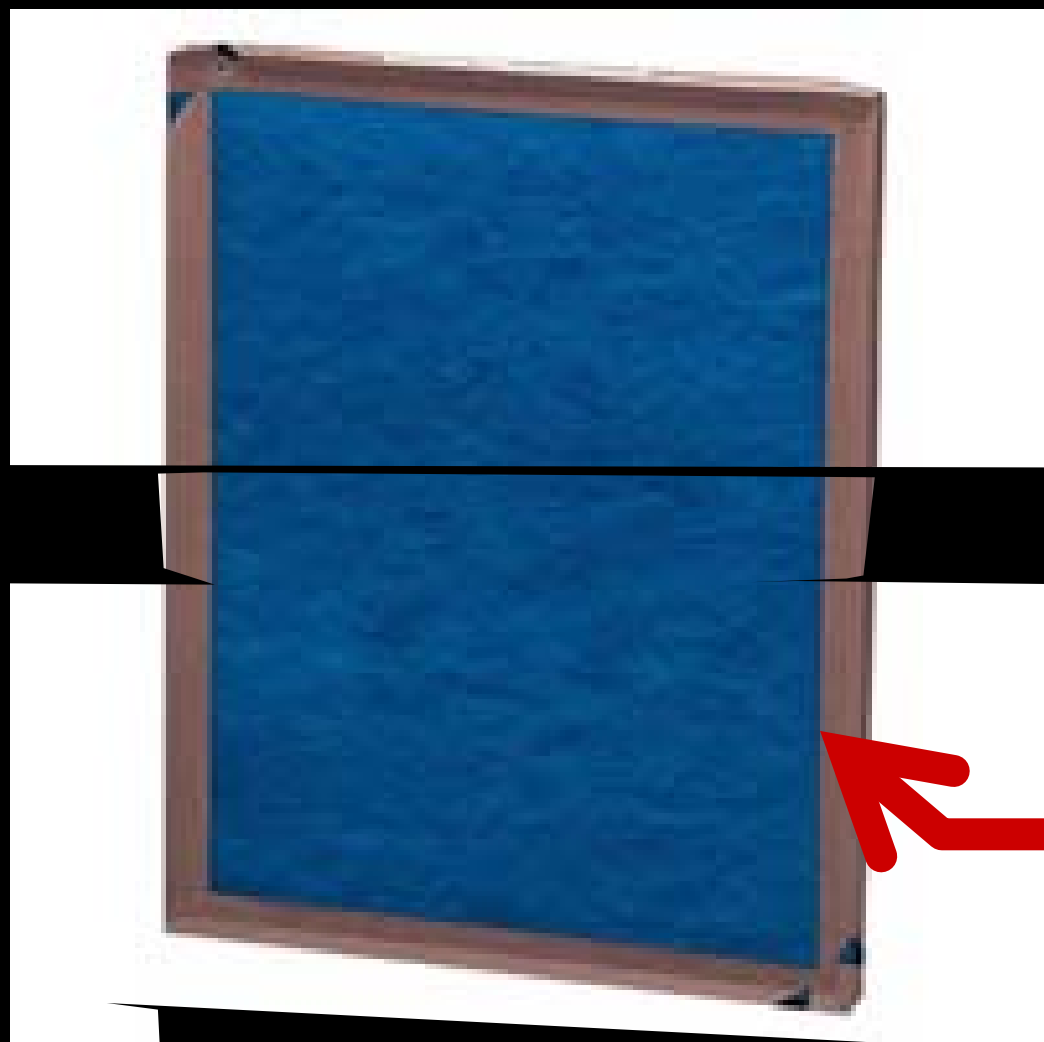
Buy Low VOC products:





FILTRATION of AIR POLLUTANTS:

THIS



**NOT
THAT!**



Buy EPA Certified Fireplaces:



**What new technology
will completely
change housing?**

**Hint: It has nothing to do with
construction.**

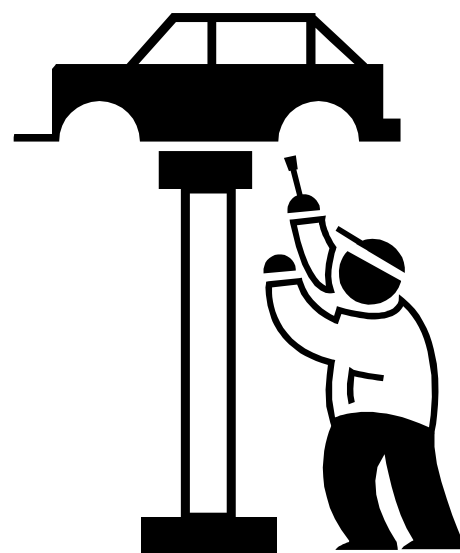
Low Cost Infrared Cameras

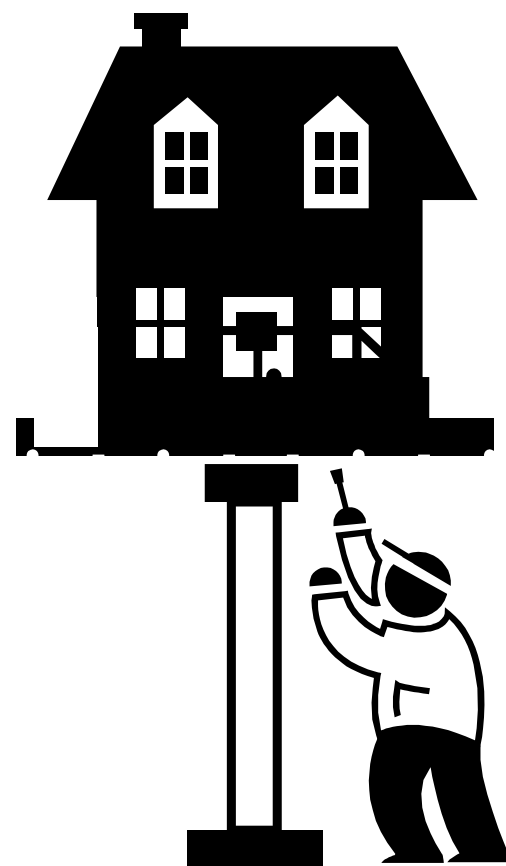


**FREE
Online
Training**

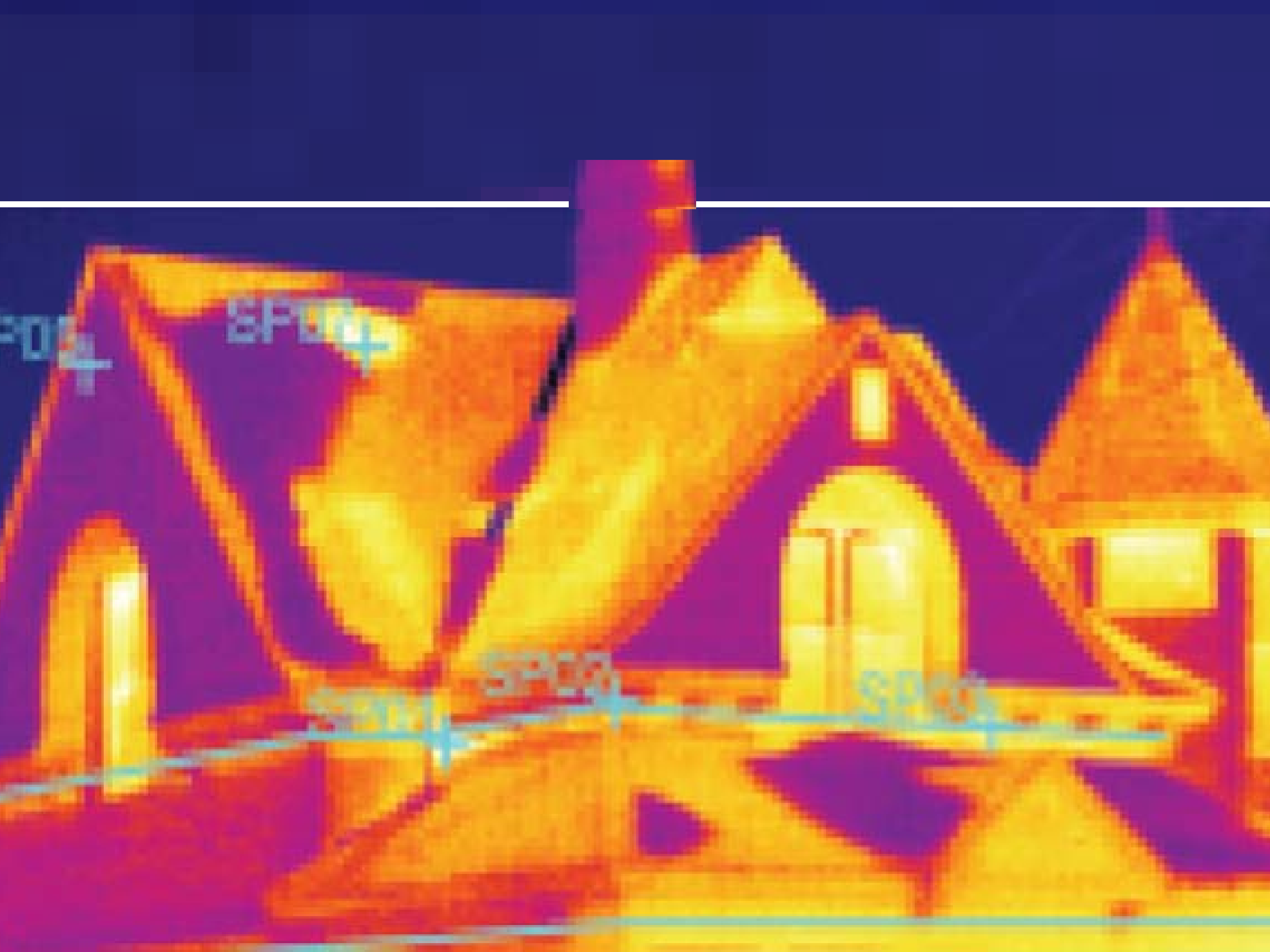
 [View Larger Image](#)

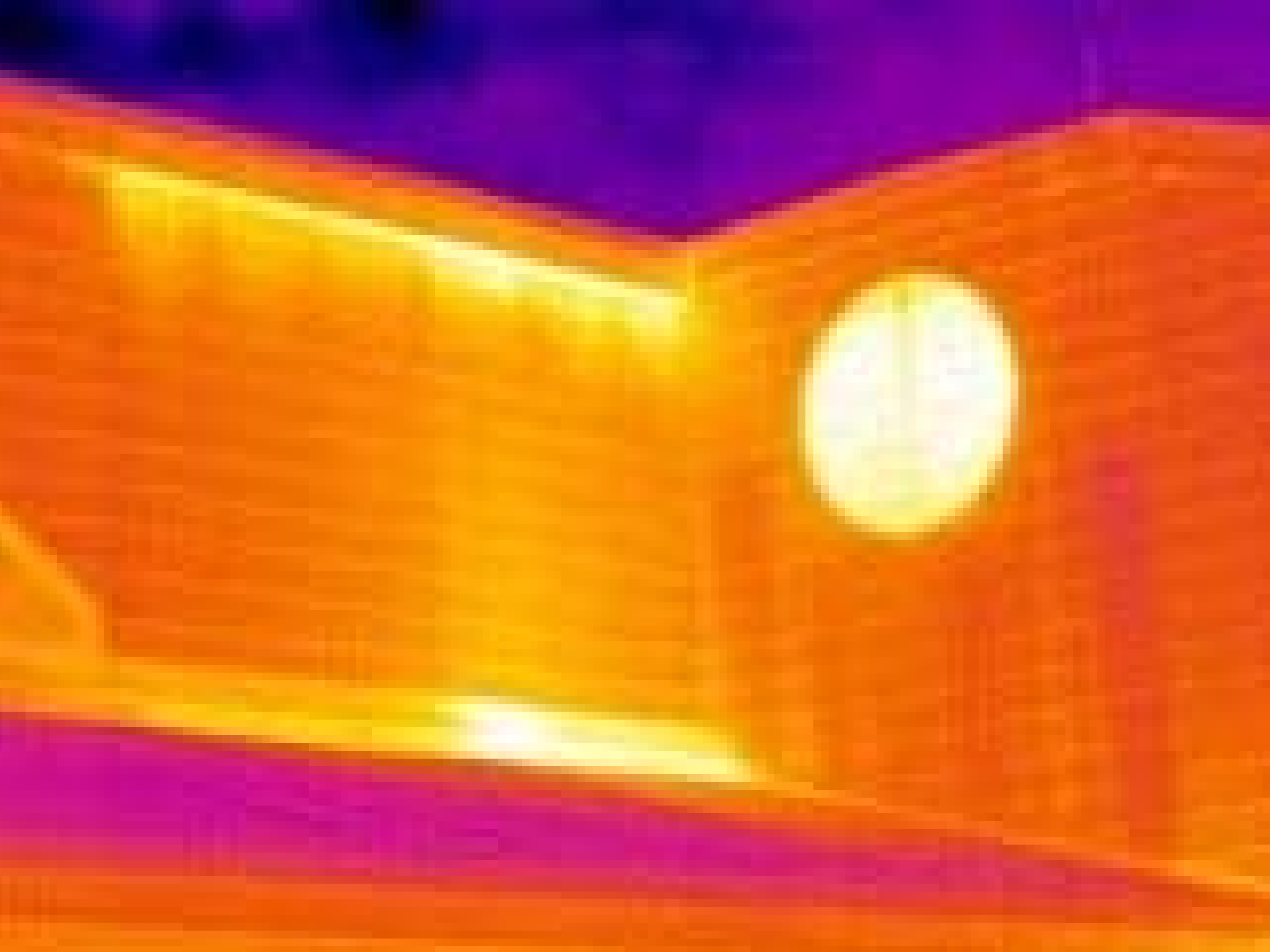
Your Price:
\$4,995.00



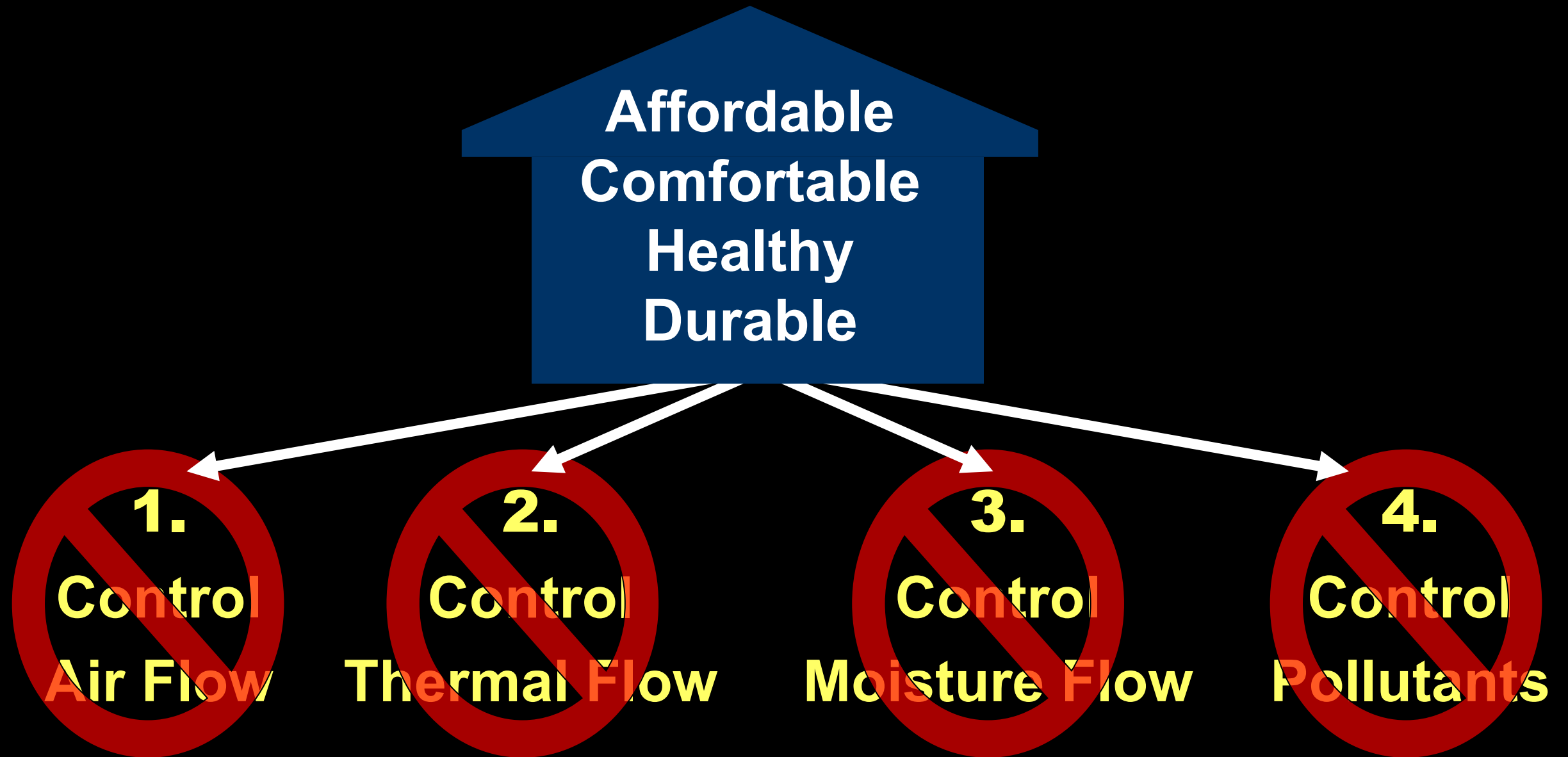








Status Quo 95+% of Homes: “Houston, We Have a Problem”





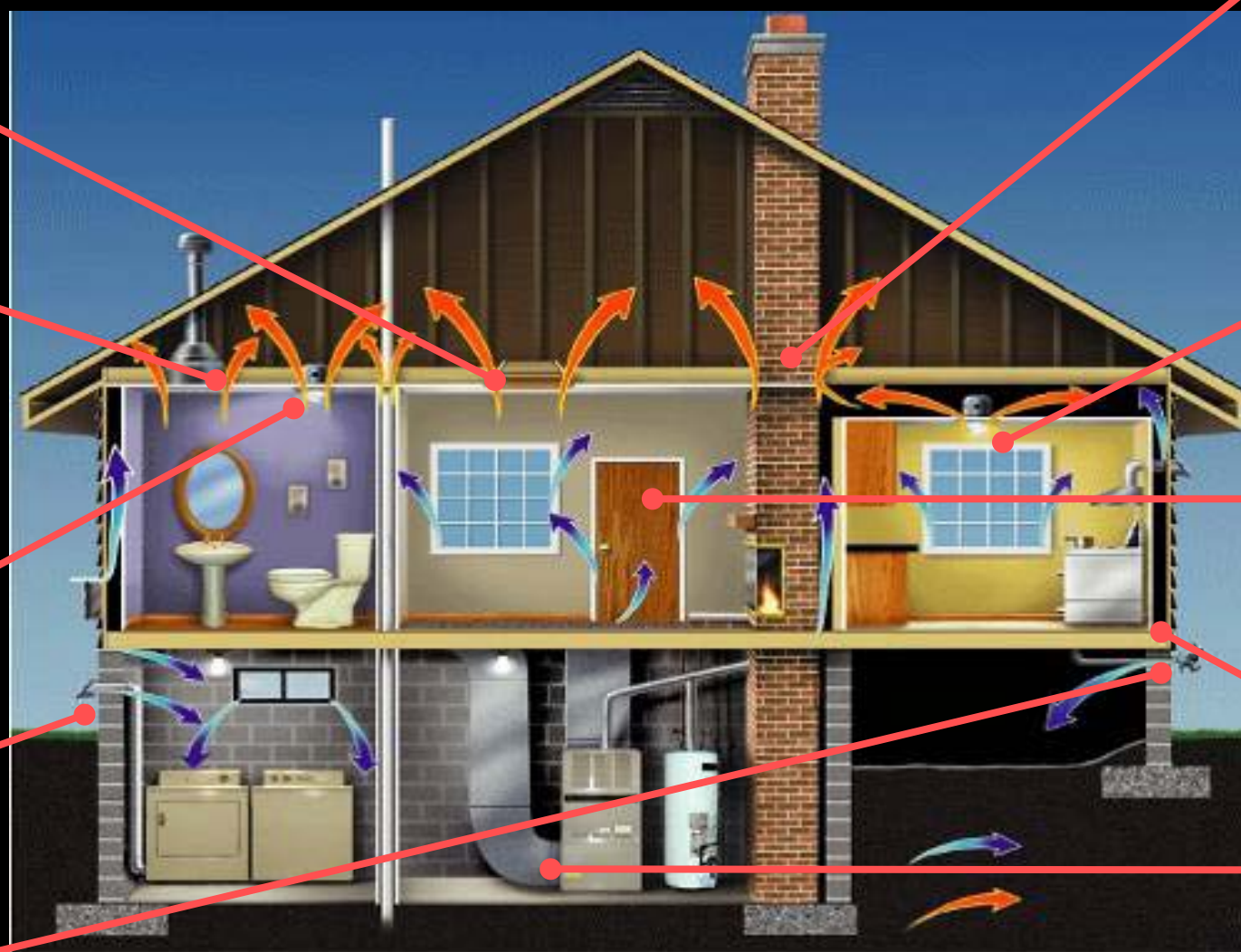
Good News: WE KNOW WHERE THE BIG HOLES ARE...

**Access
Panels**

**Drywall at
Top Plate**

Penetrations:

- Ceiling Fixtures
- Vents
- Plumbing



Chases

Cracks:

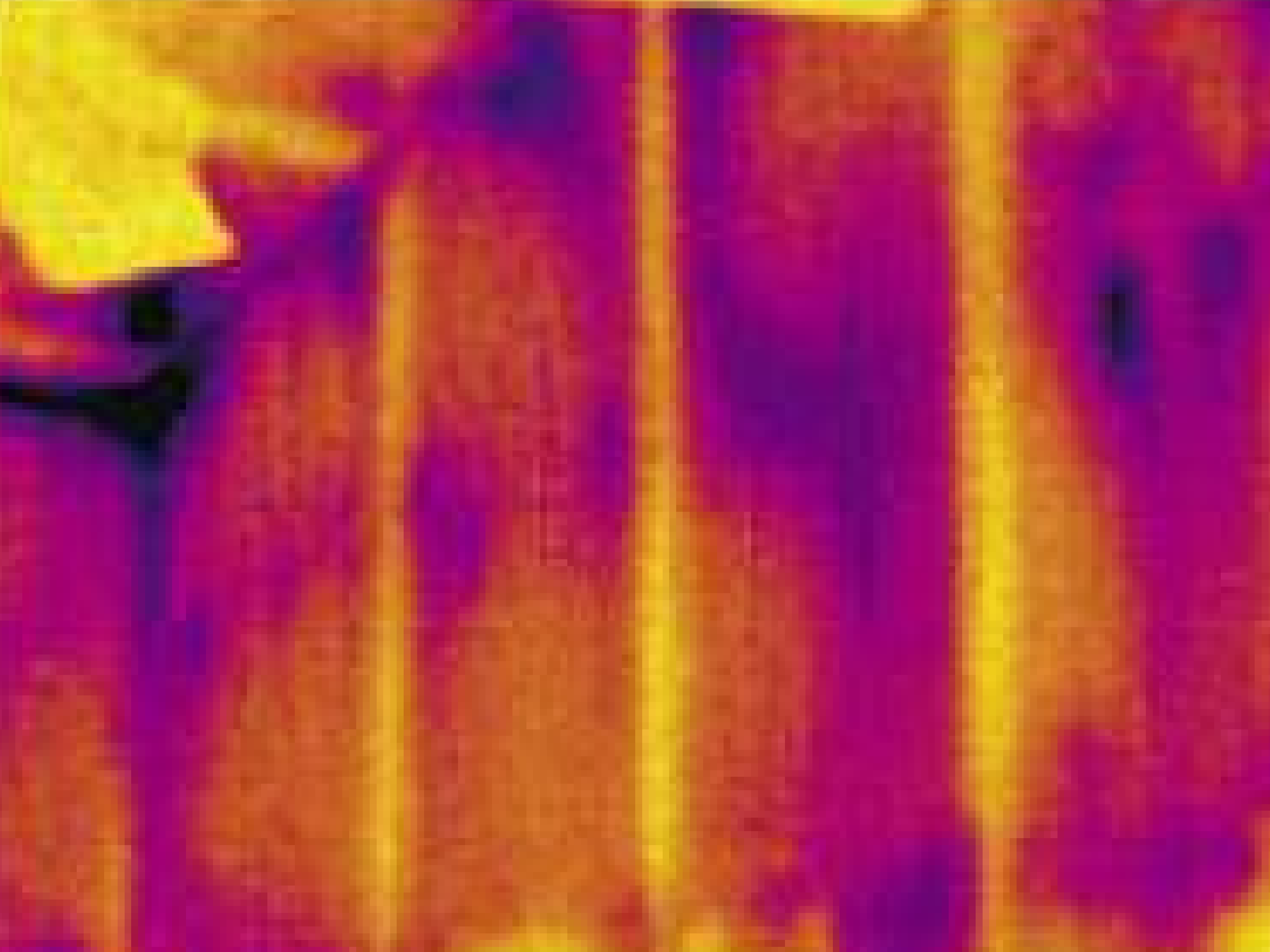
- Window Openings
- Door Openings
- Sill Plates

Ducts



KEEP OUT PESTS WHEN AIR SEALING:







WALL INSULATION:

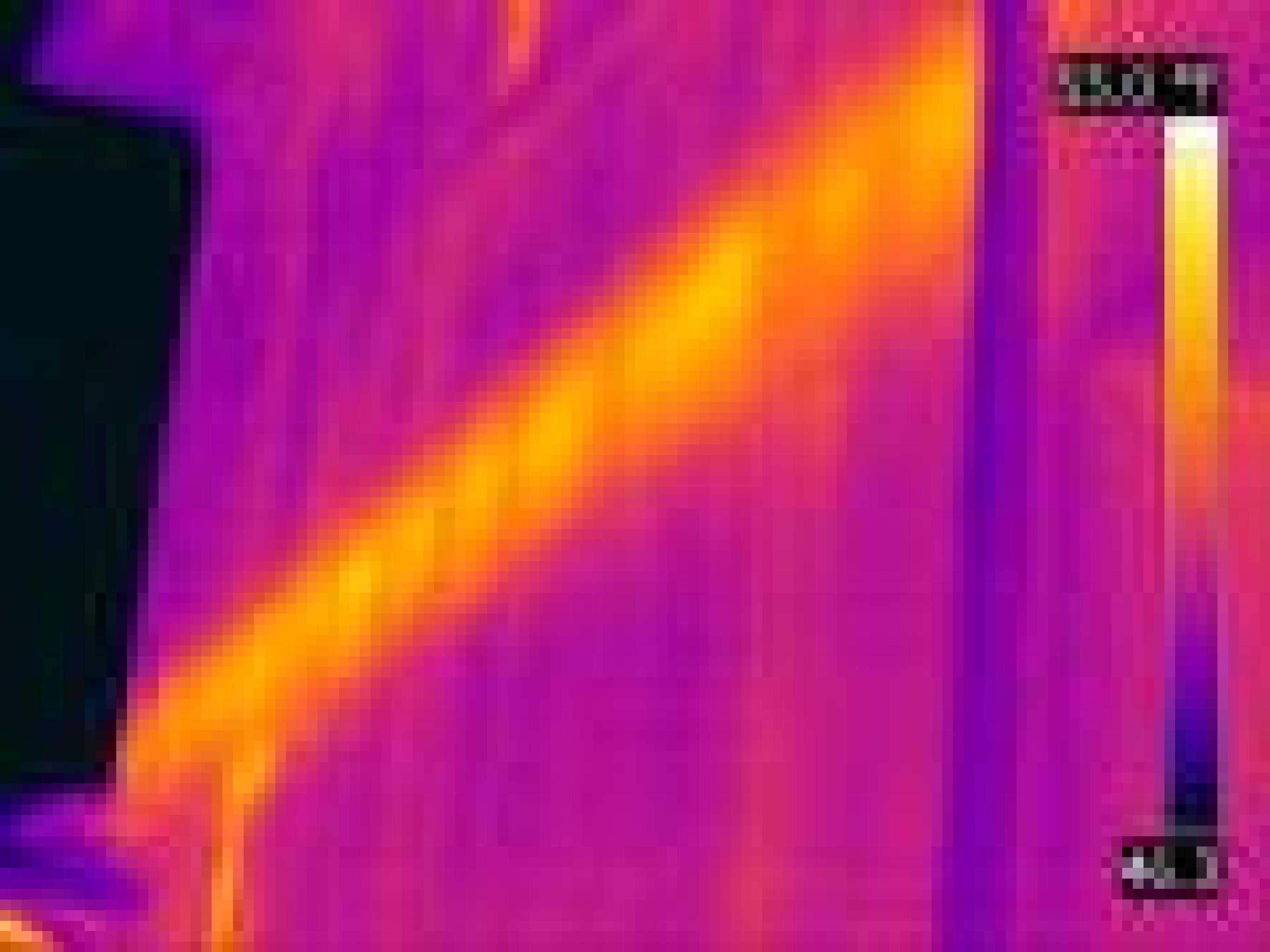
THIS



NOT



THAT!





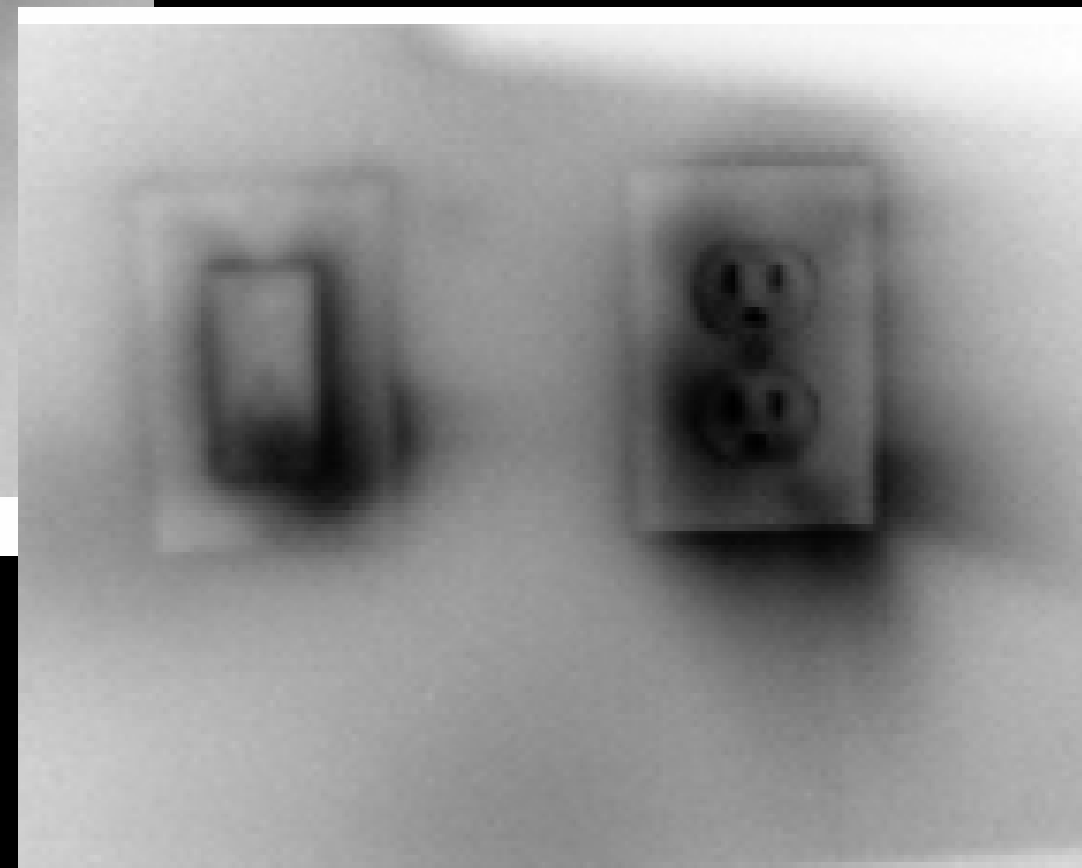
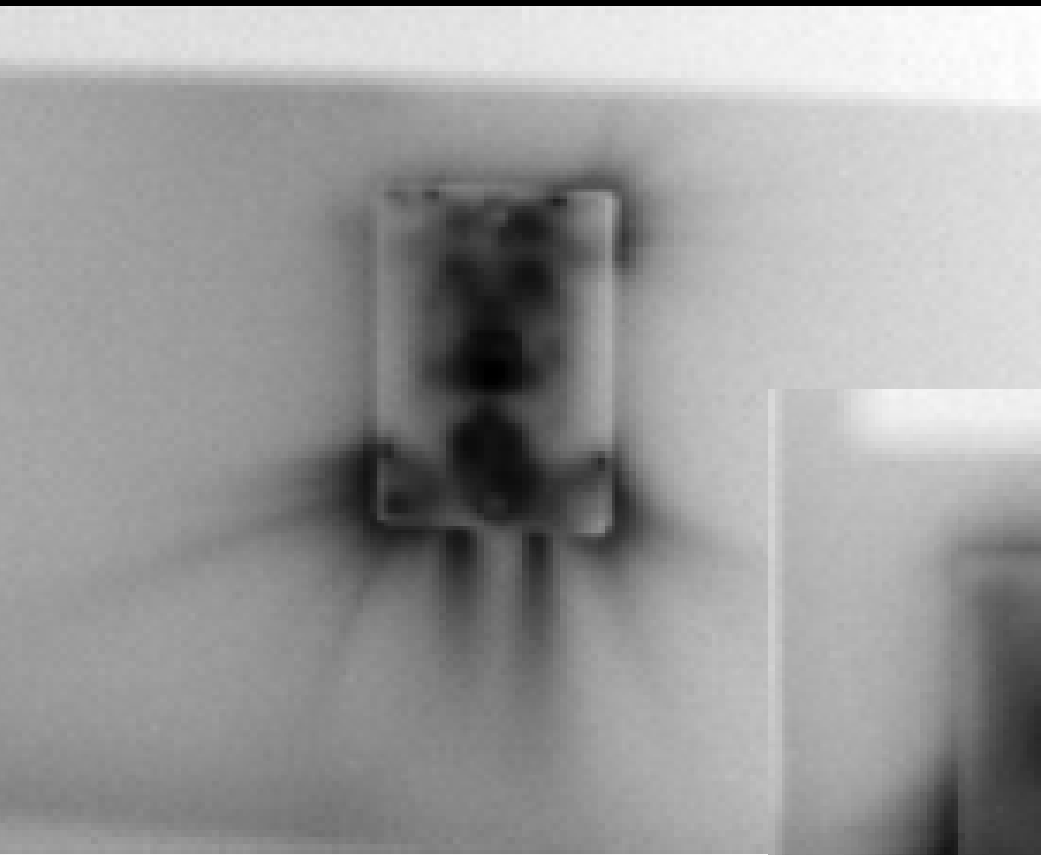
BAND JOISTS:

THIS →



**NOT
THAT!**

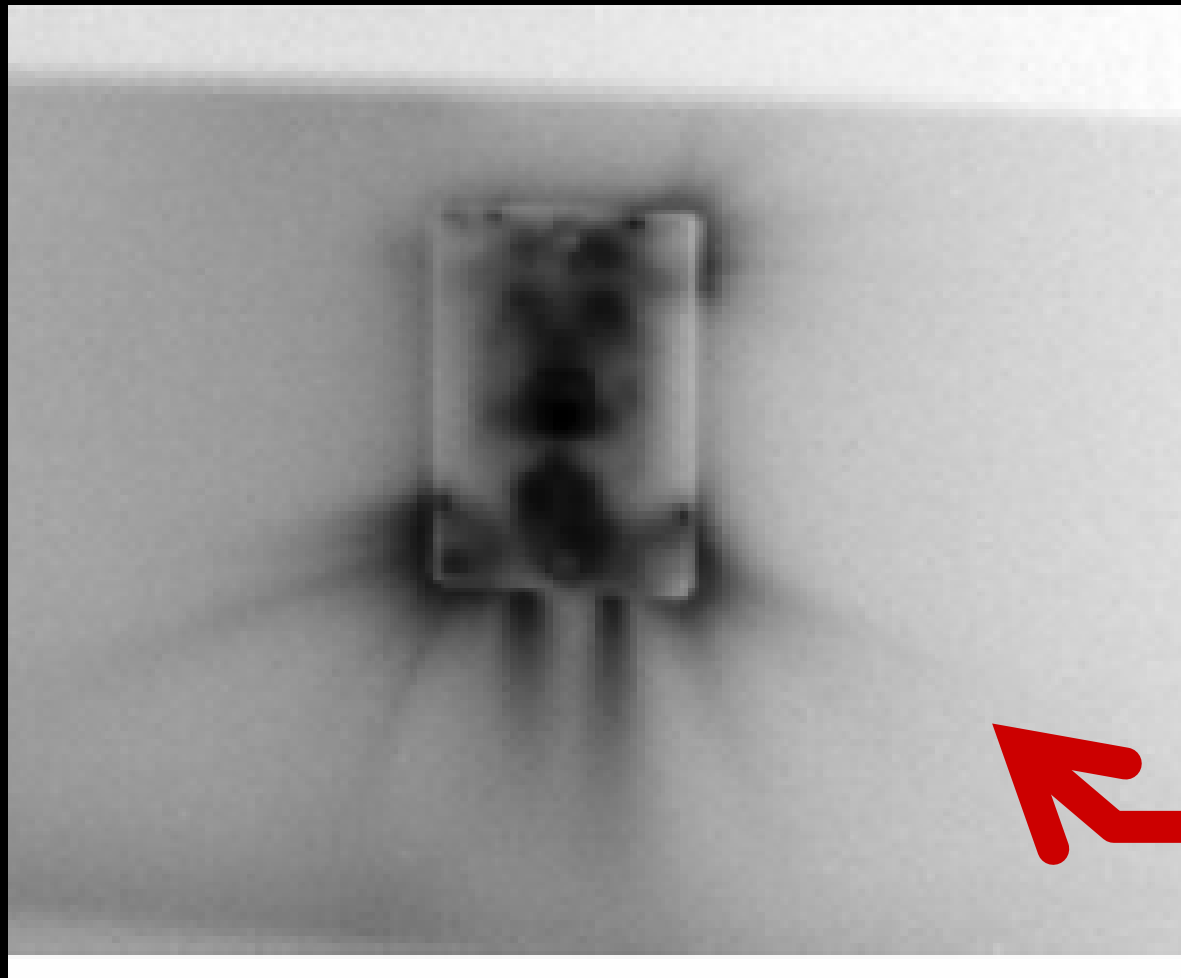
DO ELECTRIC OUTLETS/SWITCHES LEAK?





OUTLET & SWITCH PENETRATIONS:

THIS



NOT

THAT!

WHY CONTROL AIR FLOW?



Courtesy of Building Science Corp.

INSULATION IS NOT AN AIR BARRIER







**Big
Remaining
Hole!**



**Dryer pulling
flame out of
the heater**



COMBUSTION SAFE EQUIPMENT:

THIS



**NOT
THAT!**



**COMBUSTION SAFE
EQUIPMENT:**

**LIVE IN
THIS**



**NOT
THAT!**



PRESSURE BALANCED HVAC SYSTEM:

THIS



NOT



THAT!







PRESSURE BALANCED HVAC SYSTEM:

THIS



**NOT
THAT!**



MEASURING MOISTURE IN VARIOUS BUILDING MATERIALS

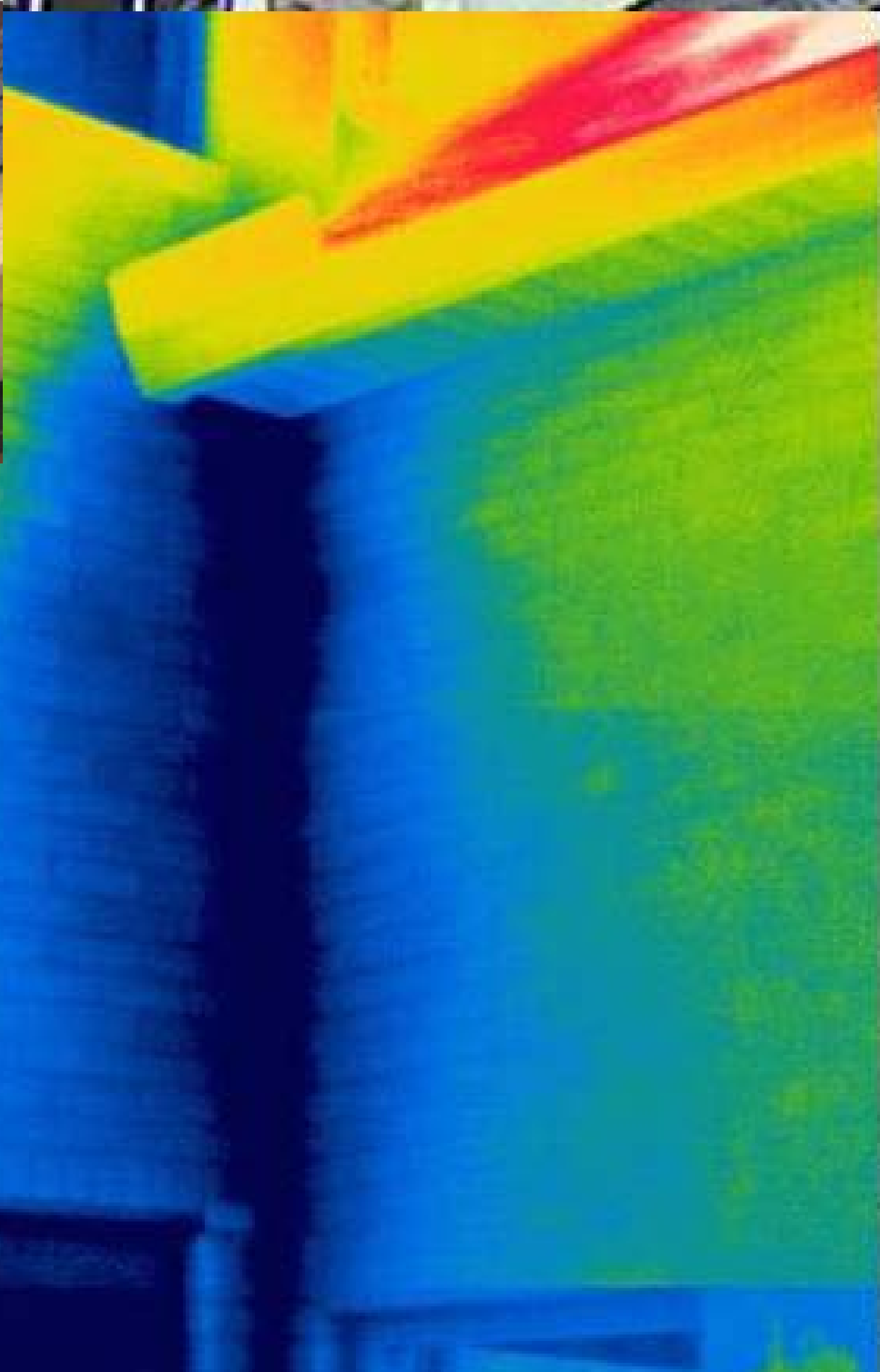


WATER PROTECTION SYSTEMS:

THIS



**NOT
THAT!**



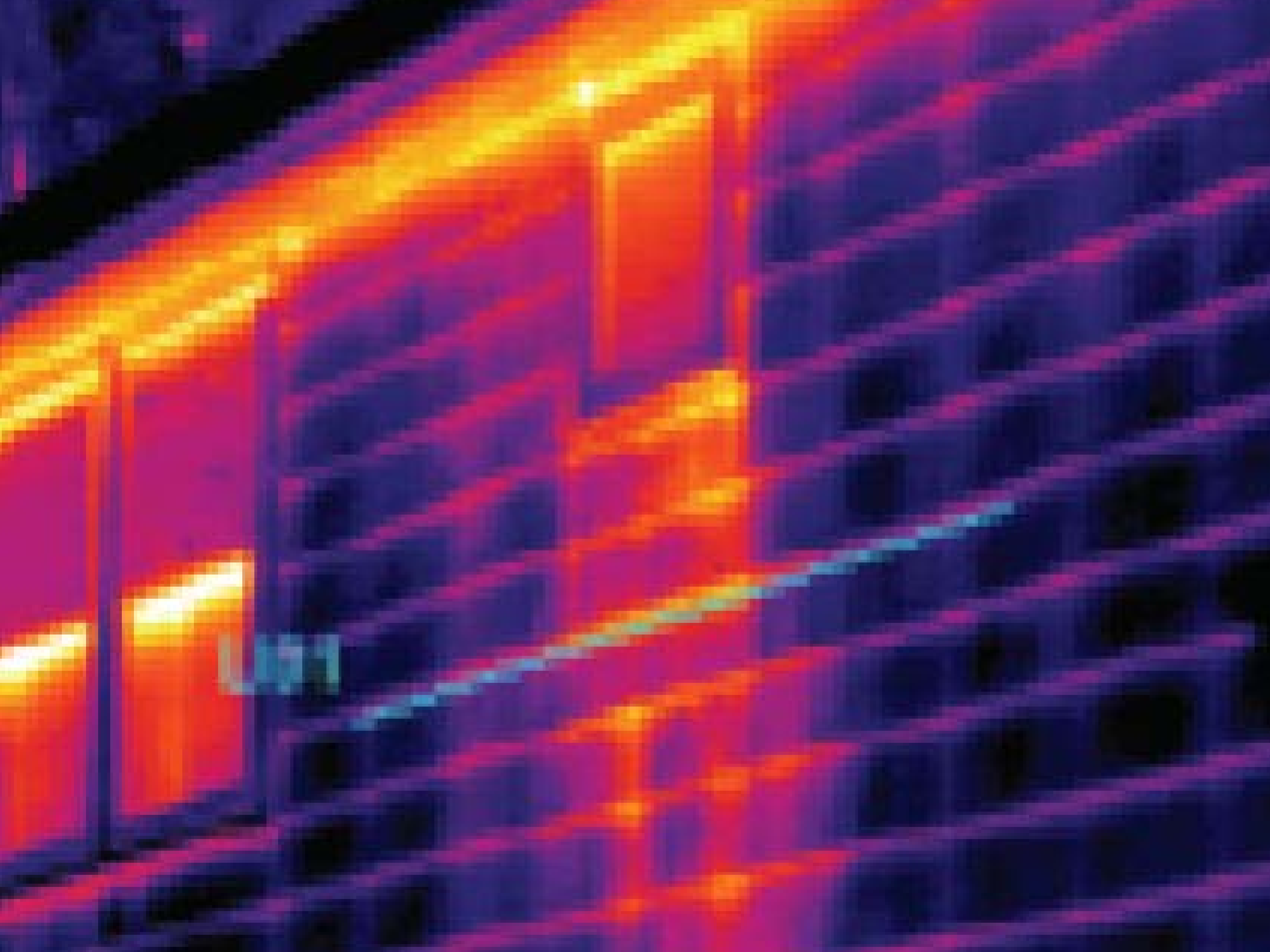


WATER PROTECTION SYSTEMS:

THIS



**NOT
THAT!**





WATER PROTECTION SYSTEMS:

THIS



**NOT
THAT!**



WATER PROTECTION SYSTEMS:

THIS



NOT

THAT!



U.S. DEPARTMENT OF ENERGY
SOLAR DECATHLON

2011

<http://www.eere.energy.gov>



Time to shine.